A functional screening assay for aldopentose transport in Saccharomyces cerevisiae

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D-Xylose and L-arabinose are two important aldopentose sugars present in lignocellulosic hydrolysates, which is a major feedstock for 2nd generation bioethanol production. Saccharomyces cerevisiae is the proferred ethanol production organism but lacks efficient pentose transport and metabolism. Heterologous xylose and arabinose metabolic genes have been successfully expressed in S. cerevisiae, enabling growth on these carbon sources. A practical way of cloning transporter genes is by functional complementation where enhanced transport can be scored as higher growth rate. This is efficient if growth rate is limited only by transport. The growth rate on arabinose for recombinant S. cerevisiae is very slow, even at very high substrate concentrations, preventing functional complementation for transport. We have designed a test strain that utilize glucose, that is limited by aldopentose consumption for growth. Proof of concept will be presented and examples of the use of this strain in the search for arabinose and xylose transporters will be discussed.